

### **REMARKS**

Claims 1-7, 9-19, 26-32 and 54-59 are pending. Of these, claims 1, 11, 26, 57, and 58 are independent. Claims 11-19, 26-34, 55, 56 and 58 are withdrawn. Accordingly, only claims 1-7, 9, 10, 54, 57, and 59 are currently under examination. In view of the above amendments and the following remarks, favorable consideration is respectfully requested.

#### **Objection to the Claims**

The Office Action objected to claim 1 as being unclear. With respect to the claims as amended herein, these objections are respectfully traversed. In order to expedite prosecution of this matter, this paper amends claim 1 to recite that the "analyzer data" is "mass spectrometric analyzer data," as recited in the preamble. Claim 4 is amended to remove the clause "one or more" from the recitation of the "pump means." Accordingly, Applicants respectfully request that the Examiner withdraw the objections.

#### **Compliance with 35 U.S.C. §112**

The Office Action objected to claims 1-7, 9, 10, 54 and 59 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Particularly, the Office Action objects to the language of "arranged to" as used in claim 1, stating that "[p]roper and conventional phrases to incorporate an electronic controller process limitation(s) with patentable weight into an apparatus claim are for e.g., a controller [] 'configured to...' or 'programmed to...' for claiming a control device for performing an active process steps/schemes embedded in a computer/software; or 'a controller configured for...' and 'programmed for...' for claiming a controller capable of performing a process limitation." Office Action pp.6-7. While Applicants respectfully disagree with the characterization, Applicants have amended claim 1 herein in an effort to expedite prosecution of the matter. Accordingly, this paper modifies the four instances of "arranged" in claim 1 to recite "configured," as suggested by the Examiner. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection and pass this claim to allowance.

Rejection Under 35 U.S.C. §103

Independent claims 1 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,794,806 as to Nicoli. Section 14 of the Office Action at pages 8-10 indicates that Nicoli discloses all of the features of claim 1, apart from the diluted sample exiting the mixer into the third conduit at a third flow rate substantially equal to the sum of the first and second flow rates. However, the Office considers this to be obvious, to further complete the mixing procedure within the third conduit. The Office argues that, where the general condition of a claim is disclosed in the prior art, discovering the optimum arrangement of the device to achieve a desired working parameter involves only routine skill in the art. We respectfully traverse the rejection and a) disagree that this feature would have been obvious to the skilled person and b) submit that Nicoli fails to disclose a number of other features of claim 1, for the reasons set out below.

Nicoli relates to a method of determining particle size. In Nicoli, a set quantity of a sample is injected into a mixing chamber altogether (in one go/in one step). Then, a continuous supply of diluent is provided to the mixing chamber, and the fluid in the mixing chamber is discharged to a scattering cell for detection. As such, the concentration of the sample in the fluid being discharged to the scattering cell decreases continuously throughout the process. Indeed, as indicated in several places throughout the Nicoli disclosure, e.g. column 8, lines 47 to 48, Nicoli describes an "exponential dilutor system". Nicoli teaches that particle size determination is best achieved when the light scattering intensity from the scattering cell is at a particular level. The purpose of using the exponential dilutor system is therefore to continuously dilute a sample which is passed through the scattering cell until the detected light scattering intensity falls to the desired level. Once the desired level is reached, the flow of liquid diluent into the mixing chamber is halted, so that the diluted sample in the scattering cell is stationary, so that an autocorrelation measurement of the particle size can take place (see column 8, lines 59 to 66). As such, Nicoli is not at all interested in what the actual dilution factors are, but simply getting the light scattering intensity to the desired level. Also, since the concentration of the sample is continuously decreasing, Nicoli does not and cannot "provide a diluted sample with a stable

desired dilution factor” (see column 3, line 66 to column 4, line 3; column 6, lines 3 to 4; column 7, lines 14 to 16; and column 10, lines 30 to 51), as recited in claim 1.

In contrast, claim 1 recites a mass spectrometer pumping device for supplying a diluted sample to a mass spectrometric analyser. Claim 1 also recites that the apparatus is configured to “provide a diluted sample with a stable desired dilution factor.” In mass spectrometric analysis, as explained in the description of the related art section of the present invention, providing a stable and precisely controlled dilution factor is important, since mass spectrometric analysis takes place over a finite time and a stably diluted sample throughout that finite period of time is needed for accurate analysis. As is clear above, Nicoli does not disclose a mass spectrometer pumping device, nor could the arrangement of Nicoli be used as a mass spectrometer pumping device. In particular, Nicoli specifically teaches against the provision of stable and precisely known dilution factors.

A specific discussion of the features of distinction of claim 1 over Nicoli will now be provided.

As indicated above, Nicoli does not disclose a mass spectrometer pumping device for supplying a diluted sample to a mass spectrometric analyser. The (lack of) stability and precision of sample dilution disclosed in Nicoli is not suitable for mass spectrometric implementation. Rather, Nicoli is concerned with particle size determination, which is a quite different technical field altogether.

Given these opposing operational characteristics, the skilled person would not look at Nicoli and consider applying it to a mass spectrometer pumping device.

The Office has already acknowledged that Nicoli does not disclose the third flow rate being substantially equal to the sum of the first and second flow rates in Nicoli. Claim 1 requires the apparatus to “provide a diluted sample with a stable desired dilution factor.” This means that, during use, both a sample from the first conduit and a diluent from the second conduit must be continuously drawn into the third conduit through the mixer; otherwise, the dilution of the sample in the third conduit could not be stable. In Nicoli, the sample is injected in one go and then the sample is continuously fed through the mixer, to continuously dilute the sample down in

an exponential dilution manner. Thus, after the sample injection, there is no further flow rate through the first conduit in Nicoli. Thus, Nicoli does not disclose the provision of a diluted sample through a third conduit at a flow rate which is substantially equal to the flow rate of a sample through a first conduit and a flow rate of a diluent through a second conduit. Since Nicoli is specifically concerned with providing an exponential dilution of the sample – i.e., specifically not providing a stable dilution factor – the skilled person would not consider modifying Nicoli to provide an arrangement in which a diluted sample is drawn through a third conduit at a flow rate substantially equal to the flow rate of a sample through a first conduit and the flow rate of a diluent through a second conduit, since this would be entirely contrary to the whole teaching of Nicoli.

In addition, Nicoli does not disclose “a valve, or variable constriction, disposed in one of the first and second conduits and configured to control the first or second flow rate respectively,” as recited in claim 1. As indicated in paragraph [0009] of the application, for mass spectrometer type sample dilution, precise dilution is required and so accurate control of flow rates is needed and a constant dilution level during analysis is needed. Nicoli does not have any such teaching. In fact, Nicoli teaches quite the opposite; namely, that the dilution factor should be continuously increased, that it is not needed to know the actual dilution factor, that reproducible dilution factors are not required, and that accurate regulation of the flow rate of the diluent is not required (see column 3, line 66 to column 4, line 3; column 6, lines 3 to 4; column 7, lines 14 to 16; and column 10, lines 30 to 51 of Nicoli). As such, Nicoli does not disclose the control of flow rate of the sample or diluent in the first or second conduit, since control of the flow rate of the diluent is specifically taught in Nicoli as not being required.

Furthermore, the valves in Nicoli (reference numerals 204, 206, 208, 210) are nothing more than on/off, or open/close, valves for permitting fluid to pass or not to pass (simply ‘stop’ or ‘go’ type valves). They are controlled by the valve control 220 only to open or close; there is no disclosure of partial opening or closing which could regulate flow rates (see column 11, lines 28 to 43 and 61 to 63; column 13, lines 12 to 13; and column 13, lines 20 to 42 of Nicoli). Thus Nicoli does not disclose valves/variable constrictions which are adjustable to allow the flow rates

in the first or second conduit to be controlled, as required by claim 1. Since Nicoli specifically teaches that control of flow rates or regulation of flow rates is not required, the skilled person would not consider modifying the on/off valves of Nicoli to provide such a flow rate valve/variable constriction, since this is specifically taught as not being needed.

As discussed above, Nicoli does not disclose a mass spectrometer pumping device, so the pump control in Nicoli is not configured to receive mass spectrometric analyser data, as required by claim 1.

Furthermore, Nicoli is not concerned with actual dilution levels (see column 3, line 66 to column 4, line 3 and column 10, lines 30 to 51 of Nicoli), but just 'blindly' dilutes a sample until a desired light scattering intensity is measured at the scattering cell (see column 9, line 50 to column 10, line 3 of Nicoli). Thus, Nicoli does not seek to measure or determine an amount by which a sample is diluted, since what the actual dilution is does not matter to Nicoli; it is the arrival at an appropriate light scattering intensity which is important (and not the actual dilution which happens to give rise to it). As such, Nicoli does not teach a pump controller configured to receive mass spectrometric analyser data indicative of the amount by which a sample is diluted. Again, since Nicoli specifically teaches against stable and precise dilution factor provision and against the need to know that the dilution factors are, the skilled person would not be motivated to modify Nicoli to use it in a mass spectrometer setting or to monitor the actual dilution levels.

Not only does Nicoli not receive mass spectrometric analyser data, or data indicative of the amount by which a sample is diluted, Nicoli also does not control the pump control to adjust any of the first, second or third flow rates based on this data. For a start, there is no first flow rate for the sample, as the sample is injected into the mixing chamber in one go, so, once discharged, there is no more flow of the sample (see column 7, line 49 to column 8, line 19 of Nicoli). Secondly, in Nicoli, it appears that the third flow rate is equal to the second flow rate, so that Nicoli does not disclose the possibility of changing the third flow rate without also changing the second flow rate in the same way. All the pump control 112 in Nicoli does is shut off the diluent supply when the desired light scattering intensity is reached, to stop the flow of diluted sample in the scattering cell, so a static measurement can be taken. There is no control of flow



rates in the first, second or third conduits in Nicoli, as required by claim 1.

So, Nicoli does not disclose a pump controller which is configured to control the pump means so that any of the first, second or third flow rates are adjustable with respect to one another in dependence upon the received data. Since the purpose of the arrangement in Nicoli is to arrive at a desired light scattering intensity from the scattering cell, the skilled person would receive no motivation from Nicoli to modify it to arrive at something falling within the terms of claim 1, because Nicoli simply shuts off the pumping system once the desired light scattering intensity is reached, so there is no reason why the skilled person would seek to modify flow rates in the first, second or third conduits.

Finally, since Nicoli specifically teaches against stable and precisely controlled dilution factors, Nicoli does not disclose a pump controller configured to control the pump means to provide a diluted sample with a stable desired dilution factor. Again, given the contrary teachings in Nicoli, the skilled person would receive no motivation from it to apply it to a mass spectrometer setting or to seek to provide a diluted sample with a desired stable dilution factor, based on the teaching of Nicoli.

Because Nicoli does not disclose a mass spectrometer pumping device and specifically teaches that stable dilution and accurate flow rate control are not needed or desired, it cannot be fairly argued that the skilled person would obviously modify the arrangement of Nicoli to make all the necessary changes to incorporate the missing/novel features of claim 1. Nicoli teaches quite the opposite to what the skilled person in mass spectrometer pumping devices would be looking for, so he would not be motivated or led to modify Nicoli in a way which would arrive at a mass spectrometer pumping device falling within the terms of claim 1 and achieving what it achieves.

Finally, the Office appears to be engaging in impermissible hindsight reconstruction of the claimed invention. The proper inquiry is whether, if Applicants' disclosure is completely ignored, there is any reason that would prompt a person of ordinary skill to make the proposed modification of Nicoli. Here, if the Applicants' disclosure is ignored, there is no reason that would prompt a person of ordinary skill to make the proposed modification of Nicoli. The courts

permit use of some types of hindsight, but do not permit use of the particular type of hindsight involved here, which is hindsight of Applicants' disclosure. Here, the hindsight analysis resulting in modification is unobvious because Nicoli provides no such teaching or suggestion, given its entirely different configuration and implementation.

For the above reasons at least, claim 1 is in condition for allowance over Nicoli. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection and pass this claim to allowance.

Independent claim 57 recites some subject matter similar to that of claim 1 and should be allowable for many of the reasons discussed above. For example, claim 57 recites, a system that "provide[s] a diluted sample with a stable desired dilution factor," as discussed above. It also includes "a pump for pumping the diluted sample from the mixer through the third conduit at a third flow rate substantially equal to the sum of the first and second flow rates, wherein one of the first and second conduits comprises a valve, or variable constriction, disposed therein for controlling the first or second flow rate, respectively." Accordingly, claim 57 should be allowable for at least a number of the reasons discussed above.

#### Dependent Claims

Claims 2-7, 9-10, 54 and 59 each depend from Claim 1, and are also believed to be patentable over Nicoli, for example for the same reasons discussed above in association with Claim 1.

Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

With this paper, Applicants are petitioning for a 3-month extension of time with the requisite extension fee. Although Applicants believe that no additional fee is due, the Commissioner is hereby authorized to charge any fees required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone, LLP.

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HAYNES AND BOONE, LLP  
IP Section, Suite 700  
2323 Victory Avenue  
Dallas, Texas 75219  
Telephone: (972) 739-6969  
Facsimile: (214) 200-0853


Respectfully submitted,



Dustin T. Johnson  
Registration No. 47,684

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I hereby certify that this correspondence (including any listed enclosures) is being electronically filed in the United States Patent and Trademark Office via the EFS-Web system on February 3, 2011.

  
Jan Cleveland